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A Framework for Examining Social Stress and Susceptibility in Air Pollution and Respiratory Health

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Background and Objectives: There is growing interest in disentangling the health effects of spatially clustered social and physical environmental exposures, and in exploring potential synergies among these, with particular attention to the combined effects of psychosocial stress and air pollution. Both exposures may be elevated in lower income urban communities; and it has been hypothesized that stress, which can influence immune function and susceptibility, may potentiate the effects of air pollution in respiratory disease onset and exacerbation.

Methods: In this paper, we attempt to synthesize the relevant research from social and environmental epidemiology, toxicology, immunology, and exposure assessment to provide a useful framework for environmental health researchers aiming to investigate the health effects of environmental pollution in combination with social or psychological factors.

Results: We review the existing epidemiological and toxicological evidence on synergistic effects of stress and pollution, then describe the physiologic effects of stress and key issues related to measuring and evaluating stress as it relates to physical environmental exposures and susceptibility. Finally, we identify some of the major methodological challenges ahead as we work toward disentangling the health effects of clustered social and physical exposures and accurately describing the interplay among these.

Conclusions: There still is tremendous work to be done toward understanding the combined and potentially synergistic health effects of stress and pollution. As this research proceeds, we recommend careful attention to the relative temporalities of stress and pollution exposures, to non-linearities in their independent and combined effects, to physiological pathways not elucidated by epidemiological methods, and to the relative spatial distributions of social and physical exposures at multiple geographic scales.